



21865-002001/6502

## SEQUENCE LISTING

<110> Yu, Mang  
Fang, Fang

<120> Broad Spectrum Anti-Viral Therapeutics  
And Prophylaxis

<130> 21865-002001/6502

<140> US 10/718,986  
<141> 2003-11-21

<150> US 60/428,535  
<151> 2002-11-12

<150> US 60/464,217  
<151> 2003-04-19

<160> 12

<170> FastSEQ for Windows Version 4.0

<210> 1  
<211> 58  
<212> PRT  
<213> Bos taurus

<400> 1  
Arg Pro Asp Phe Cys Leu Glu Pro Pro Tyr Thr Gly Pro Cys Lys Ala  
1 5 10 15  
Arg Ile Ile Arg Tyr Phe Tyr Asn Ala Lys Ala Gly Leu Cys Gln Thr  
20 25 30  
Phe Val Tyr Gly Gly Cys Arg Ala Lys Arg Asn Asn Phe Lys Ser Ala  
35 40 45  
Glu Asp Cys Met Arg Thr Cys Gly Gly Ala  
50 55

<210> 2  
<211> 24  
<212> PRT  
<213> Homo sapiens

<400> 2  
Asn Gly Arg Arg Ile Cys Leu Asp Leu Gln Ala Pro Leu Tyr Lys Lys  
1 5 10 15  
Ile Ile Lys Lys Leu Leu Glu Ser  
20

<210> 3  
<211> 27  
<212> PRT  
<213> Homo sapiens

<400> 3  
Gly Arg Glu Leu Cys Leu Asp Pro Lys Glu Asn Trp Val Gln Arg Val  
1 5 10 15  
Val Glu Lys Phe Leu Lys Arg Ala Glu Asn Ser  
20 25

<210> 4  
<211> 34  
<212> PRT  
<213> Homo sapiens

<400> 4  
Gln Ile His Phe Phe Ala Lys Leu Asn Cys Arg Leu Tyr Arg Lys  
1 5 10 15  
Ala Asn Lys Ser Ser Lys Leu Val Ser Ala Asn Arg Leu Phe Gly Asp  
20 25 30  
Lys Ser

<210> 5  
<211> 34  
<212> PRT  
<213> Homo sapiens

<400> 5  
Glu Leu Arg Val Arg Leu Ala Ser His Leu Arg Lys Leu Arg Lys Arg  
1 5 10 15  
Leu Leu Arg Asp Ala Asp Asp Leu Gln Lys Arg Leu Ala Val Tyr Gln  
20 25 30  
Ala Gly

<210> 6  
<211> 12  
<212> PRT  
<213> Homo sapiens

<400> 6  
Arg Arg Leu Arg Arg Met Glu Ser Glu Ser Glu Ser  
1 5 10

<210> 7  
<211> 21  
<212> PRT  
<213> Homo sapiens

<400> 7  
Lys Arg Lys Lys Lys Gly Gly Lys Asn Gly Lys Asn Arg Arg Asn Arg  
1 5 10 15  
Lys Lys Lys Asn Pro  
20

<210> 8  
<211> 379  
<212> PRT  
<213> Homo sapiens

<400> 8  
Met Ala Ser Leu Pro Val Leu Gln Lys Glu Ser Val Phe Gln Ser Gly  
1 5 10 15  
Ala His Ala Tyr Arg Ile Pro Ala Leu Leu Tyr Leu Pro Gly Gln Gln  
20 25 30

Ser Leu Leu Ala Phe Ala Glu Gln Arg Ala Ser Lys Lys Asp Glu His  
     35                        40                        45  
 Ala Glu Leu Ile Val Leu Arg Arg Gly Asp Tyr Asp Ala Pro Thr His  
     50                        55                        60  
 Gln Val Gln Trp Gln Ala Gln Glu Val Val Ala Gln Ala Arg Leu Asp  
     65                        70                        75                        80  
 Gly His Arg Ser Met Asn Pro Cys Pro Leu Tyr Asp Ala Gln Thr Gly  
     85                        90                        95  
 Thr Leu Phe Leu Phe Phe Ile Ala Ile Pro Gly Gln Val Thr Glu Gln  
     100                       105                       110  
 Gln Gln Leu Gln Thr Arg Ala Asn Val Thr Arg Leu Cys Gln Val Thr  
     115                       120                       125  
 Ser Thr Asp His Gly Arg Thr Trp Ser Ser Pro Arg Asp Leu Thr Asp  
     130                       135                       140  
 Ala Ala Ile Gly Pro Ala Tyr Arg Glu Trp Ser Thr Phe Ala Val Gly  
     145                       150                       155                       160  
 Pro Gly His Cys Leu Gln Leu Asn Asp Arg Ala Arg Ser Leu Val Val  
     165                       170                       175  
 Pro Ala Tyr Ala Tyr Arg Lys Leu His Pro Ile Gln Arg Pro Ile Pro  
     180                       185                       190  
 Ser Ala Phe Cys Phe Leu Ser His Asp His Gly Arg Thr Trp Ala Arg  
     195                       200                       205  
 Gly His Phe Val Ala Gln Asp Thr Leu Glu Cys Gln Val Ala Glu Val  
     210                       215                       220  
 Glu Thr Gly Glu Gln Arg Val Val Thr Leu Asn Ala Arg Ser His Leu  
     225                       230                       235                       240  
 Arg Ala Arg Val Gln Ala Gln Ser Thr Asn Asp Gly Leu Asp Phe Gln  
     245                       250                       255  
 Glu Ser Gln Leu Val Lys Lys Leu Val Glu Pro Pro Pro Gln Gly Cys  
     260                       265                       270  
 Gln Gly Ser Val Ile Ser Phe Pro Ser Pro Arg Ser Gly Pro Gly Ser  
     275                       280                       285  
 Pro Gln Trp Leu Leu Tyr Thr His Pro Thr His Ser Trp Gln Arg Ala  
     290                       295                       300  
 Asp Leu Gly Ala Tyr Leu Asn Pro Arg Pro Pro Ala Pro Glu Ala Trp  
     305                       310                       315                       320  
 Ser Glu Pro Val Leu Leu Ala Lys Gly Ser Cys Ala Tyr Ser Asp Leu  
     325                       330                       335  
 Gln Ser Met Gly Thr Gly Pro Asp Gly Ser Pro Leu Phe Gly Cys Leu  
     340                       345                       350  
 Tyr Glu Ala Asn Asp Tyr Glu Glu Ile Val Phe Leu Met Phe Thr Leu  
     355                       360                       365  
 Lys Gln Ala Phe Pro Ala Glu Tyr Leu Pro Gln  
     370                       375

<210> 9  
 <211> 424  
 <212> PRT  
 <213> Homo sapiens

<400> 9  
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     1                       5                           10                       15  
 Ala Ala Leu Ala Glu His Arg Ser Met Asn Pro Cys Pro Val His Asp  
     20                       25                       30  
 Ala Gly Thr Gly Thr Val Phe Leu Phe Phe Ile Ala Val Leu Gly His  
     35                       40                       45  
 Thr Pro Glu Ala Val Gln Ile Ala Thr Gly Arg Asn Ala Ala Arg Leu  
     50                       55                       60  
 Cys Cys Val Ala Ser Arg Asp Ala Gly Leu Ser Trp Gly Ser Ala Arg  
     65                       70                       75                       80

Asp Leu Thr Glu Glu Ala Ile Gly Gly Ala Val Gln Asp Trp Ala Thr  
                   85                  90                  95  
 Phe Ala Val Gly Pro Gly His Gly Val Gln Leu Pro Ser Gly Arg Leu  
                   100              105              110  
 Leu Val Pro Ala Tyr Thr Tyr Arg Val Asp Arg Leu Glu Cys Phe Gly  
                   115              120              125  
 Lys Ile Cys Arg Thr Ser Pro His Ser Phe Ala Phe Tyr Ser Asp Asp  
                   130              135              140  
 His Gly Arg Thr Trp Arg Cys Gly Gly Leu Val Pro Asn Leu Arg Ser  
                   145              150              155              160  
 Gly Glu Cys Gln Leu Ala Ala Val Asp Gly Gly Gln Ala Gly Ser Phe  
                   165              170              175  
 Leu Tyr Cys Asn Ala Arg Ser Pro Leu Gly Ser Arg Val Gln Ala Leu  
                   180              185              190  
 Ser Thr Asp Glu Gly Thr Ser Phe Leu Pro Ala Glu Arg Val Ala Ser  
                   195              200              205  
 Leu Pro Glu Thr Ala Trp Gly Cys Gln Gly Ser Ile Val Gly Phe Pro  
                   210              215              220  
 Ala Pro Ala Pro Asn Arg Pro Arg Asp Asp Ser Trp Ser Val Gly Pro  
                   225              230              235              240  
 Arg Ser Pro Leu Gln Pro Pro Leu Leu Gly Pro Gly Val His Glu Pro  
                   245              250              255  
 Pro Glu Glu Ala Ala Val Asp Pro Arg Gly Gly Gln Val Pro Gly Gly  
                   260              265              270  
 Pro Phe Ser Arg Leu Gln Pro Arg Gly Asp Gly Pro Arg Gln Pro Gly  
                   275              280              285  
 Pro Arg Pro Gly Val Ser Gly Asp Val Gly Ser Trp Thr Leu Ala Leu  
                   290              295              300  
 Pro Met Pro Phe Ala Ala Pro Pro Gln Ser Pro Thr Trp Leu Leu Tyr  
                   305              310              315              320  
 Ser His Pro Val Gly Arg Arg Ala Arg Leu His Met Gly Ile Arg Leu  
                   325              330              335  
 Ser Gln Ser Pro Leu Asp Pro Arg Ser Trp Thr Glu Pro Trp Val Ile  
                   340              345              350  
 Tyr Glu Gly Pro Ser Gly Tyr Ser Asp Leu Ala Ser Ile Gly Pro Ala  
                   355              360              365  
 Pro Glu Gly Gly Leu Val Phe Ala Cys Leu Tyr Glu Ser Gly Ala Arg  
                   370              375              380  
 Thr Ser Tyr Asp Glu Ile Ser Phe Cys Thr Phe Ser Leu Arg Glu Val  
                   385              390              395              400  
 Leu Glu Asn Val Pro Ala Ser Pro Lys Pro Pro Asn Leu Gly Asp Lys  
                   405              410              415  
 Pro Arg Gly Cys Cys Trp Pro Ser  
                   420

<210> 10  
 <211> 5  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic construct

<400> 10  
 Gly Gly Gly Gly Ser  
     1              5

<210> 11  
 <211> 2742  
 <212> DNA

<213> Actinomyces viscosus

<220>

<223> nanH gene for sialidase

<400> 11

atgacatcg atagtcctt ctccggagg cgctgccc ccctcctggg ctccctgcc 60  
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ggcctggccg acgtcaccat cacgcaggta aacgcgccc cggacggcct ctactccgtc 180  
ggcgatgtca tgacctcaa catcacccctg accaacaacca gcggcgaggc ccactcctac 240  
gccccggcct cgacgaacct gtccggaaac gtctccaagt gccggtgccg caacgtccc 300  
gccgggacga ccaagaccga ctgcaccggc ctggccacgc acacggtgac cgccgaggac 360  
ctcaaggccg gtggcttcac cccgcagatc gcctacgagg tcaaggccgt ggagtacgcc 420  
gggaaggccc tgagcacccc ggagacgatc aaggcgcgca cgagcccagt caaggccaac 480  
tcgctcgaaa tcgagtcgat cacgcgtcg tcgagccagg agaactacaa gctgggcgac 540  
accgtcagct acacgggtcg cgtcgctcg gtgtcgac agacgatcaa cgtcgccgccc 600  
accgaatctt cttcgacga cctggccgc cagtgccact gggcgccct caagccggc 660  
aaggcgccg tctacaactg caagccgctc acccacacga tcacgcaagc cgacgtcgac 720  
gccggccgct ggacgccatc gatcacccctg acggccaccg gaaccgacgg cgccaccctc 780  
cagacgctca cggccaccgg caacccgatc aacgtcgctg gcgaccaccc gcaggccacg 840  
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cagcacggc cccacgcccgg gcgcctgggt cagcagtaca cgatcaggac cgccggcg 1440  
ccggcgcagg cggctcggt ctactccgac gaccacggga agacgtggca ggccggcacc 1500  
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ggcgccgact acggccgcat ctggtaccgc aacttcacga tgaactggct cggcgagcag 1980  
tgcggccaga agccggcgga gccgagccc ggccgtcgcc gacggcgac ccctcagcgg 2040  
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cggcgaaggc cggcagcagg ctgtctcgca cgggaccaac ggcgtctga tcctggccct 2640  
tgcgggtgtc gcgggtgtcg gcgggtaccc gctgctgcgg gctcgccgtt cgaagaactg 2700  
aacacgacgac gagccggc tccggctctg agactgact ga 2742

<210> 12

<211> 913

<212> PRT

<213> Actinomyces viscosus

<220>

<223> nanH sialidase

<400> 12

Met Thr Ser His Ser Pro Phe Ser Arg Arg Arg Leu Pro Ala Leu Leu  
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 Gly Ser Leu Pro Leu Ala Ala Thr Gly Leu Ile Ala Ala Ala Pro Pro  
 20 25 30  
 Ala His Ala Val Pro Thr Ser Asp Gly Leu Ala Asp Val Thr Ile Thr  
 35 40 45  
 Gln Val Asn Ala Pro Ala Asp Gly Leu Tyr Ser Val Gly Asp Val Met  
 50 55 60  
 Thr Phe Asn Ile Thr Leu Thr Asn Thr Ser Gly Glu Ala His Ser Tyr  
 65 70 75 80  
 Ala Pro Ala Ser Thr Asn Leu Ser Gly Asn Val Ser Lys Cys Arg Trp  
 85 90 95  
 Arg Asn Val Pro Ala Gly Thr Thr Lys Thr Asp Cys Thr Gly Leu Ala  
 100 105 110  
 Thr His Thr Val Thr Ala Glu Asp Leu Lys Ala Gly Gly Phe Thr Pro  
 115 120 125  
 Gln Ile Ala Tyr Glu Val Lys Ala Val Glu Tyr Ala Gly Lys Ala Leu  
 130 135 140  
 Ser Thr Pro Glu Thr Ile Lys Gly Ala Thr Ser Pro Val Lys Ala Asn  
 145 150 155 160  
 Ser Leu Arg Val Glu Ser Ile Thr Pro Ser Ser Gln Glu Asn Tyr  
 165 170 175  
 Lys Leu Gly Asp Thr Val Ser Tyr Thr Val Arg Val Arg Ser Val Ser  
 180 185 190  
 Asp Lys Thr Ile Asn Val Ala Ala Thr Glu Ser Ser Phe Asp Asp Leu  
 195 200 205  
 Gly Arg Gln Cys His Trp Gly Gly Leu Lys Pro Gly Lys Gly Ala Val  
 210 215 220  
 Tyr Asn Cys Lys Pro Leu Thr His Thr Ile Thr Gln Ala Asp Val Asp  
 225 230 235 240  
 Ala Gly Arg Trp Thr Pro Ser Ile Thr Leu Thr Ala Thr Gly Thr Asp  
 245 250 255  
 Gly Ala Thr Leu Gln Thr Leu Thr Ala Thr Gly Asn Pro Ile Asn Val  
 260 265 270  
 Val Gly Asp His Pro Gln Ala Thr Pro Ala Pro Ala Pro Asp Ala Ser  
 275 280 285  
 Thr Glu Leu Pro Ala Ser Met Ser Gln Ala Gln His Leu Ala Ala Asn  
 290 295 300  
 Thr Ala Thr Asp Asn Tyr Arg Ile Pro Ala Ile Pro Pro Pro Pro Met  
 305 310 315 320  
 Gly Thr Cys Ser Ser Pro Thr Thr Ser Ala Arg Arg Thr Thr Ala Thr  
 325 330 335  
 Ala Ala Ala Thr Thr Pro Asn Pro Asn His Ile Val Gln Arg Arg Ser  
 340 345 350  
 Thr Asp Gly Gly Lys Thr Trp Ser Ala Pro Thr Tyr Ile His Gln Gly  
 355 360 365  
 Thr Glu Thr Gly Lys Lys Val Gly Tyr Ser Asp Pro Ser Tyr Val Val  
 370 375 380  
 Asp His Gln Thr Gly Thr Ile Phe Asn Phe His Val Lys Ser Tyr Asp  
 385 390 395 400  
 Gln Gly Trp Gly Gly Ser Arg Gly Gly Thr Asp Pro Glu Asn Arg Gly  
 405 410 415  
 Ile Ile Gln Ala Glu Val Ser Thr Ser Thr Asp Asn Gly Trp Thr Trp  
 420 425 430  
 Thr His Arg Thr Ile Thr Ala Asp Ile Thr Lys Asp Lys Pro Trp Thr  
 435 440 445  
 Ala Arg Phe Ala Ala Ser Gly Gln Gly Ile Gln Ile Gln His Gly Pro  
 450 455 460  
 His Ala Gly Arg Leu Val Gln Gln Tyr Thr Ile Arg Thr Ala Gly Gly  
 465 470 475 480  
 Pro Val Gln Ala Val Ser Val Tyr Ser Asp Asp His Gly Lys Thr Trp  
 485 490 495

Gln Ala Gly Thr Pro Ile Gly Thr Gly Met Asp Glu Asn Lys Val Val  
 500 505 510  
 Glu Leu Ser Asp Gly Ser Leu Met Leu Asn Ser Arg Ala Ser Asp Gly  
 515 520 525  
 Ser Gly Phe Arg Lys Val Ala His Ser Thr Asp Gly Gly Gln Thr Trp  
 530 535 540  
 Ser Glu Pro Val Ser Asp Lys Asn Leu Pro Asp Ser Val Asp Asn Ala  
 545 550 555 560  
 Gln Ile Ile Arg Ala Phe Pro Asn Ala Ala Pro Asp Asp Pro Arg Ala  
 565 570 575  
 Lys Val Leu Leu Leu Ser His Ser Pro Asn Pro Arg Pro Trp Cys Arg  
 580 585 590  
 Asp Arg Gly Thr Ile Ser Met Ser Cys Asp Asp Gly Ala Ser Trp Thr  
 595 600 605  
 Thr Ser Lys Val Phe His Glu Pro Phe Val Gly Tyr Thr Thr Ile Ala  
 610 615 620  
 Val Gln Ser Asp Gly Ser Ile Gly Leu Leu Ser Glu Asp Ala His Asn  
 625 630 635 640  
 Gly Ala Asp Tyr Gly Gly Ile Trp Tyr Arg Asn Phe Thr Met Asn Trp  
 645 650 655  
 Leu Gly Glu Gln Cys Gly Gln Lys Pro Ala Glu Pro Ser Pro Gly Arg  
 660 665 670  
 Arg Arg Arg Arg His Pro Gln Arg His Arg Arg Arg Ser Arg Pro Arg  
 675 680 685  
 Arg Pro Arg Arg Ala Leu Ser Pro Arg Arg His Arg His His Pro Pro  
 690 695 700  
 Arg Pro Ser Arg Ala Leu Arg Pro Ser Arg Ala Gly Pro Gly Ala Gly  
 705 710 715 720  
 Ala His Asp Arg Ser Glu His Gly Ala His Thr Gly Ser Cys Ala Gln  
 725 730 735  
 Ser Ala Pro Glu Gln Thr Asp Gly Pro Thr Ala Ala Pro Ala Pro Glu  
 740 745 750  
 Thr Ser Ser Ala Pro Ala Ala Glu Pro Thr Gln Ala Pro Thr Val Ala  
 755 760 765  
 Pro Ser Val Glu Pro Thr Gln Ala Pro Gly Ala Gln Pro Ser Ser Ala  
 770 775 780  
 Pro Lys Pro Gly Ala Thr Gly Arg Ala Pro Ser Val Val Asn Pro Lys  
 785 790 795 800  
 Ala Thr Gly Ala Ala Thr Glu Pro Gly Thr Pro Ser Ser Ser Ala Ser  
 805 810 815  
 Pro Ala Pro Ser Arg Asn Ala Ala Pro Thr Pro Lys Pro Gly Met Glu  
 820 825 830  
 Pro Asp Glu Ile Asp Arg Pro Ser Asp Gly Thr Met Ala Gln Pro Thr  
 835 840 845  
 Gly Ala Pro Ala Arg Arg Val Pro Arg Arg Arg Arg Arg Arg Pro  
 850 855 860  
 Ala Ala Gly Cys Leu Ala Arg Asp Gln Arg Ala Ala Asp Pro Gly Pro  
 865 870 875 880  
 Cys Gly Cys Arg Gly Cys Arg Arg Val Pro Ala Ala Ala Gly Ser Pro  
 885 890 895  
 Phe Glu Glu Leu Asn Thr Arg Arg Ala Gly His Pro Ala Leu Ser Thr  
 900 905 910

135